A Green Infrastructure Plan

to Restore, Connect, and Protect
South Carolina's Habitats

Berkeley, Charleston, and Dorchester
Council of Governments Region
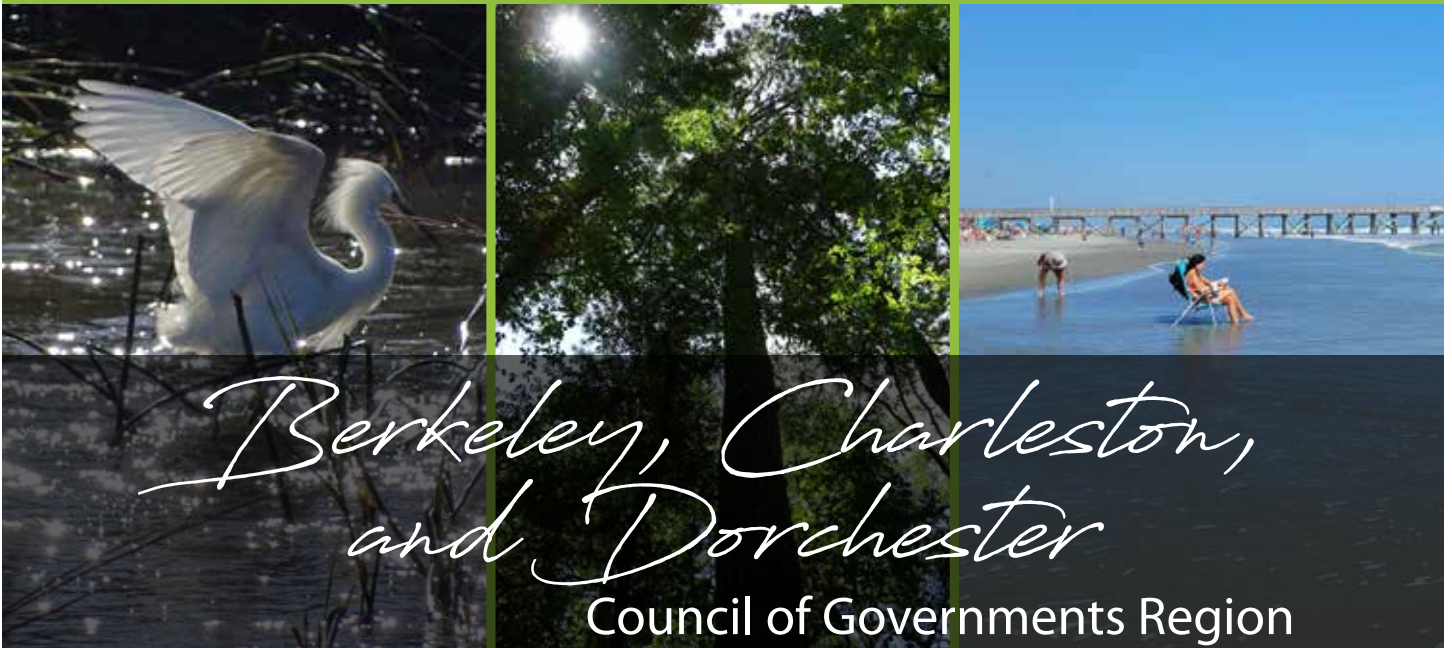
Planning for Green Infrastructure involves protecting and connecting the natural and cultural assets of the BCD region.

Green Infrastructure Center

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

SOUTH CAROLINA FORESTRY COMMISSION

BCDCOG
BERKELEY-CHARLESTON-DORCHESTER
COUNCIL OF GOVERNMENTS

March 2023

Executive Summary

The Berkeley, Charleston, and Dorchester (BCD) Council of Governments (COG) region contains extensive cultural and natural resources, from the vast marshes and forests of Francis Marion National Forest to historic plantations and scenic blueway trails. Growth in the region continues with new residents and tourists drawn to the beautiful beaches, vibrant towns, and Charleston, the state's largest city. Collaboration between the counties and municipalities on strategies for managing growth and development, sea level rise, and storm surge are of vital importance for the region's resilience. Continuation of local efforts to conserve land, create regional partnerships, and establish both ordinances and planning guidance for growth that protects green infrastructure (GI) will ensure the beauty and culture of the BCD landscape for future generations.

The BCD COG is located in the southeast of the state's low-country region, bordered by the Santee River to the northeast, the Atlantic Ocean to the east, the Edisto River to the southwest, and Lakes Moultrie and Marion to the northwest. This rich landscape includes coastline, dunes, sea islands, salt marsh, wetlands, forests, blackwater rivers, agricultural fields, and historic plantations.

The counties of Berkeley, Charleston, and Dorchester comprise this distinctive region with its vibrant towns, the Charleston metropolitan area, and the large swaths of protected wildlife habitat in the ACE Basin and Francis Marion National Forest. Historic churches, plantations, and prehistoric shell rings along with the living Gullah Geechee culture contribute to a unique sense of place. The beauty of the coast, lively towns and cities, culture, economy, and quality of life attract tourism and new residents to the region. Additionally, there is a military presence in the region with the Joint Base Charleston. Approximately 36% of land in the BCD COG region is protected in several state parks, national forest land, national wildlife refuges, wildlife management areas, military land, and other open spaces.

It is also part of the Gullah Geechee Heritage Corridor, which refers to a large swath of South Carolina's coast that became home to many freed slaves after the end of slavery. This region is also the ancestral home of the Kusso, Sewee, Santee, and Winyah Native people. Additional Native people likely include the Bohicket, Stono, Edisto, Etiwan, Kiawah, Sampa, and Wando peoples. The Edisto Natchez-Kusso Tribe and the Wassamasaw Tribe of Varnertown Indians are state recognized native groups living in this region today.

Berkeley, Charleston, and Dorchester (BCD) region contains coastline, dunes, sea islands, salt marsh, wetlands, blackwater rivers, agricultural fields, and historic plantations.

Green Infrastructure Planning Process

This Green Infrastructure Plan comprises a set of maps and strategies for conserving and restoring a connected landscape in the state. GIC led the BCD COG and local stakeholders though GIC's Six-Step Green Infrastructure Planning Process with a series of four workshops from 2021-22. This process involved mapping habitats cores and corridors, as well as existing natural and cultural assets, followed by risk analysis to inform strategies for action. With these data, local stakeholders determined priority areas for conservation in the region, as well as strategies to ensure a connected landscape into the future. GIC followed regional COG workshops with state agency engagement. The resulting statewide plan is informed by and includes the COG's regional priorities.

This COG chapter will appear as a separate document, distinct from the full report, since it is one of ten COG chapters that have been included in the statewide assessment. The full report can be found here: https://scgiplan-gicinc.hub.arcgis.com/ or at www.gicinc.org or https://www.scfc.gov/management/urban-forestry/

The statewide scale of this project did not allow GIC to drill down to the level of county and city green infrastructure plans, but did establish important priorities for each region.

In the first workshop, GIC presented an overview of the project and shared a map of the region's ranked habitat cores. Feedback on the accuracy of the map and areas of development were noted and incorporated.

In the second workshop, GIC presented themed overlay maps that showed the region's agricultural soils, water resources, recreation, and cultural assets and asked workshop attendees to add their local input on additional assets, such as new blueway trails or cultural corridors. The final BCD asset maps and dataset included new data recommended by participants.

BCD FAST FACTS

1,776,000 acres– total COG area (2,775 mi^2)

1,229,440 acres– of habitat cores (1,921 mi^2)

69% of COG land area is habitat cores

582,400 acres– of protected cores (910 mi^2)

47% of habitat cores are protected cores

633,600 acres– area of protected land (cores and other) (990 mi^2)

36% of total area are protected land

279,680 acres– area of public parkland (437 mi^2)

16% of total area is public parkland

1,067,520 acres– area of habitat cores with known cultural/archaeological resources (1,668 mi^2)

451,840 acres– area of habitat cores with highest value ranking (top 5th) (706 mi^2)

624,640 acres– area of habitat cores that intersect a groundwater protection zone (976 mi^2)

222,720 acres– area of prime agricultural soils on open land (348 mi^2)

184,960 acres of wetlands (289 mi^2)

2090 mi of 2,538 mi (82%)– miles of streams that flow within a habitat core

370 of 564 (66%)– of habitat cores support cultural or recreational assets

265 of 564 (47%)– habitat cores that support known rare, threatened, or endangered species

In the third workshop, GIC presented draft maps of risks to habitat cores in the region, including development, utility-scale solar development, and impaired waters. Stakeholder feedback about these risks was used to update and finalize the risk maps.

In the fourth and final workshop, GIC shared a strategy map that showed ranked habitat cores, protected lands, and regional corridors. The stakeholders then considered priority habitats and risks to those assets and recommended strategies to reduce or prevent impacts to high-value resources.

6-Step Green Infrastructure Planning Process

1. **Set Your Goals.** What does your community value?

2. **Review Data.** What do we know or need to know, to map identified values? Combine the state modeled data with local data.

3. **Map Your Community's Ecological and Cultural Assets.** Based on the goals established in Step 1 and data from Step 2.

4. **Assess Risk.** What assets are most at risk and what could be lost, if no action was taken?

5. **Rank Assets and Determine Opportunities.** Based on those assets and risks you have identified, which ones should be restored or improved?

6. **Implement Opportunities.** Include natural asset maps in both daily and long-range planning (park planning, comp plans, zoning, tourism and economic development, seeking easements etc.)
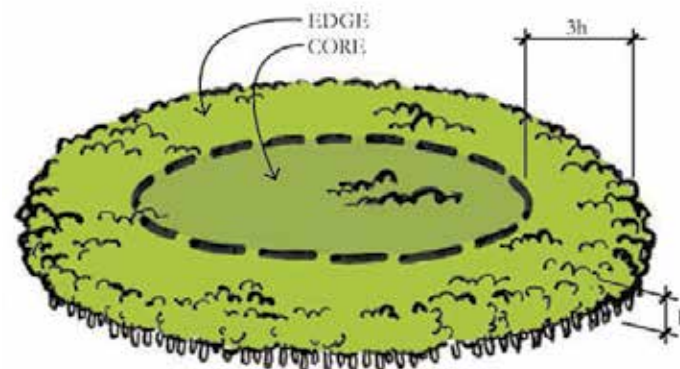
Habitat Cores

Habitat cores are intact areas of the landscape that provide adequate habitat to support native species and were modeled using source data from the 2019 National Land Cover Dataset. Habitat cores are forests, forested wetlands, and marshes at least 100 acres or more in size and are ranked using additional attributes such as water richness, topography, and the presence of rare, endangered, or threatened species. This size is large enough to provide adequate foraging and nesting habitat for interior forest dwelling birds and to support a range of other wildlife species.

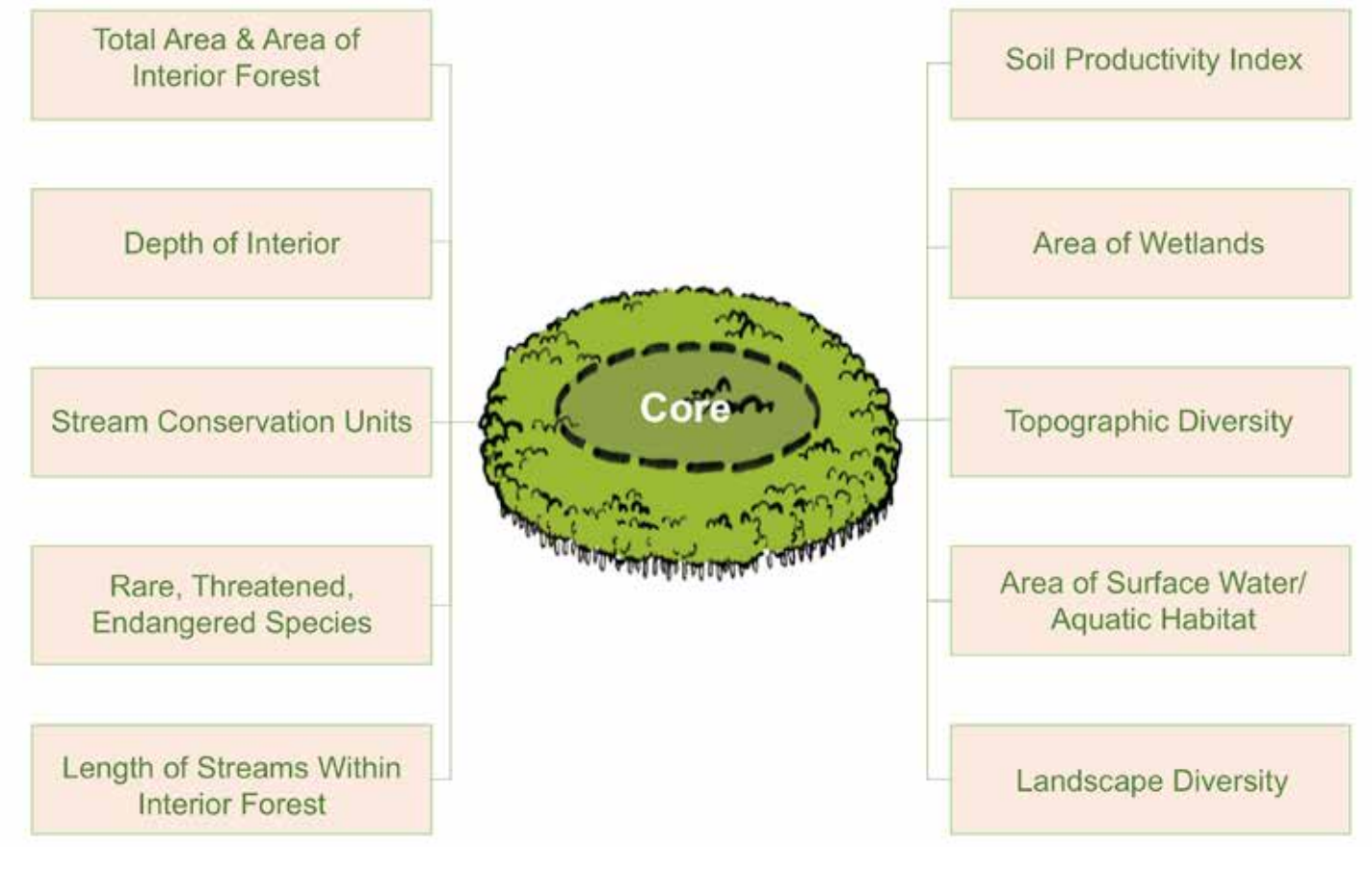> **Habitat cores encompass 69% of BCD COG land area.**

For more on how habitat cores are created, see the Methods and Maps section (page 7) and the Technical Appendix of the full report.

Ranking cores for the values they provide allows land-use planners, agency officials, and site managers to prioritize those specific habitat cores that best meet management goals and objectives, while providing the highest value for species.

Habitat cores consist of an area of intact interior wildlife habitat of 100 acres or more and an edge area that serves as a buffer absorbing impacts from outside the core.

Habitat cores are ranked based on these ecological metrics.

- Total Area & Area of Interior Forest
- Depth of Interior
- Stream Conservation Units
- Rare, Threatened, Endangered Species
- Length of Streams Within Interior Forest
- Soil Productivity Index
- Area of Wetlands
- Topographic Diversity
- Area of Surface Water/ Aquatic Habitat
- Landscape Diversity

GIC modeled and mapped ranked habitat cores across both the region and state, based on ecological metrics, *see chart above*.

For more on corridor modeling see the Introduction section (pages 10 and 11) and the Technical Appendix of the full report.

Corridors

Wildlife moves between habitat cores along corridors that support biodiversity by allowing species to move across the landscape and repopulate areas following such disturbances as hurricanes or fires. Restoration or preservation of corridors may also present opportunities to incorporate trails for human recreation. In addition to regional corridors, GIC modeled corridors that are of statewide importance. A graphic representation of this connectivity is displayed on the maps as state and local corridor lines. As the region continues to grow, every effort should be made to continue to maintain these corridors for a more connected and resilient landscape.
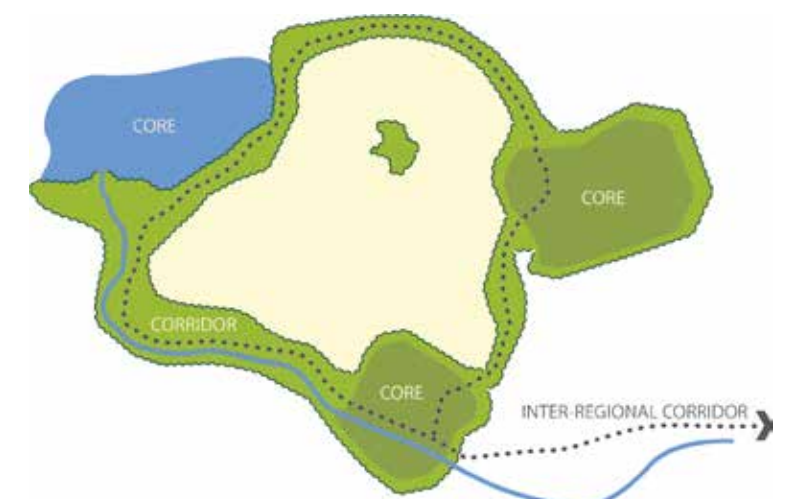
Green Infrastructure planning is about connecting the landscape. Corridors provide connections between core habitats. A well-connected landscape is more resilient.
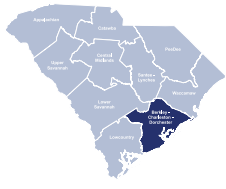
Assets

Natural Assets are the environmental elements that provide healthy surroundings, recreational opportunities, and clean water and food for both people and wildlife. These natural assets include forests, waterways, wetlands, bays, agricultural soils, and other natural resources. Cultural Assets are the landscape elements or uses that people value, such as parks, boat landings, trails, historic or archaeological sites, or scenic vistas and roads that add to the beauty of the area. Natural assets support cultural assets by providing scenic backdrops to historic sites, buffering them from storms and providing settings in which to enjoy them, such as the trails through historic sites that engage visitors in history while they enjoy the natural surroundings. GIC mapped these assets using existing state and national datasets, as well as data from stakeholders. The asset maps include water, agriculture, recreation, and cultural assets. Locating these assets is the first step in protecting them and allows decision-makers and planners to make more informed decisions about growth and conservation.

Risks

Mapping important habitats, agricultural soils, and cultural sites is only a first step towards planning to conserve important assets into the future. Mapping risks to understand which assets are most vulnerable is the next step. GIC analyzed the following risks across the state: sea level rise, storm surge, impaired waters, development, and solar development. These risk maps can be used to determine most critical regional risks and priority areas for conservation. Sea level rise maps can be used to determine areas to protect for marsh migration. Storm surge maps and impaired waters maps can be used to determine areas to target for riparian plantings. Development and solar development maps can guide conservation efforts, as well as planning policy. Tools to mitigate risk can also include planning for marsh migration, establishing solar ordinances, or drawing urban growth boundaries to avoid high-value habitat cores.

BCD Risks

40 of 564 (7%) habitat cores with **impaired streams**

153 of 564 (27%) habitat cores at risk of **development**

367 of 564 (65%) habitat cores at risk of **solar development**

112 of 564 (20%) habitat cores at risk of **sea level rise**

165 of 564 (29%) habitat cores at risk of **storm surge**

413 of 564 (73%) habitat cores at **cumulative risk**

Abundant recreational opportunities are available in the BCD region including paddling a blueway trail.

Regional Observations

The BCD region's highest quality habitat cores include the nearly 259,000 protected acres in Francis Marion National Forest. Additional high-quality cores are found in the ACE Basin, Four Holes Swamp Area, and Lake Connector Area between Lake Moultrie and Marion. High quality cores are also found along the Edisto River, Ashley River, and Santee River. The larger wildlife corridors in the region also follow the Edisto and Santee River corridors and connectivity can be ensured by maintaining buffers and seeking protection along these rivers. Prime agricultural soils in the region are found mostly in Dorchester County. The region supports cultural assets such as historic plantations and battlefields, with a higher concentration in the Charleston area. Additionally, there are abundant recreation opportunities such as hiking in state parks, paddling a blueway trail, or biking a section of the East Coast Greenway. The number of assets highlighted in the maps is the result of participation by stakeholders, so those counties with higher participation in the workshops show more of their assets represented on the maps.

Protected lands make up 36% of the total area in the BCD COG, the highest percentage in the state and above the statewide rate of 14%. The Governor has adopted the 30 by 30 goal to preserve 30% of the state's lands by 2030. The BCD region is already exceeding this goal regionally, but protection across the region varies considerably, so local municipalities should continue to work through the Charleston County Greenbelt program, the Lowcountry Land Trust and other organizations to protect high value habitat in the region. Public parkland in the region is 16% of the total area, above the 5% statewide rate, and the highest percentage in the state. Currently 47% of regional habitat cores are protected and the habitat cores and corridors map shows the most important lands that still need protection. As new conservation easements and parkland are considered, connectivity between existing protected lands and habitat cores should be a key consideration for deciding which lands to protect.

Marshes and floodplains are extensive in the region and sea level rise and storm surge are risks likely to impact habitats and human use of the land in all three counties over the next 40 years. Another risk for the region is urban development, especially suburban sprawl-patterned growth. Development risks are greatest along the I-26 corridor, in the Lake Moultrie area, and along Route 17. Solar development risk is highest in Dorchester County where much of the region's prime agricultural soils are located. With the many risks facing this region, data-driven planning used to guide smart growth, new ordinances, and land protection will be critical to maintain habitat connectivity, food production capability, and resiliency.

Regional Stakeholders

Participants in the BCD stakeholder workshops included representatives from:

- BCD Council of Governments
- Berkeley County
- Charleston County
- Dorchester County
- City of Charleston
- City of North Charleston
- City of Folly Beach
- Town of Awendaw
- Town of Hollywood
- Town of Summerville
- Town of Monk's Corner
- Town of Mt. Pleasant
- Lowcountry Land Trust
- Gullah Geechee Island Coalition
- SC Sea Grant Consortium
- SC Coastal Conservation League
- SC Department of Natural Resources
- SC Forestry Commission
- SC Department of Health and Environmental Control

Percentage of Total Area that is Public Park Land
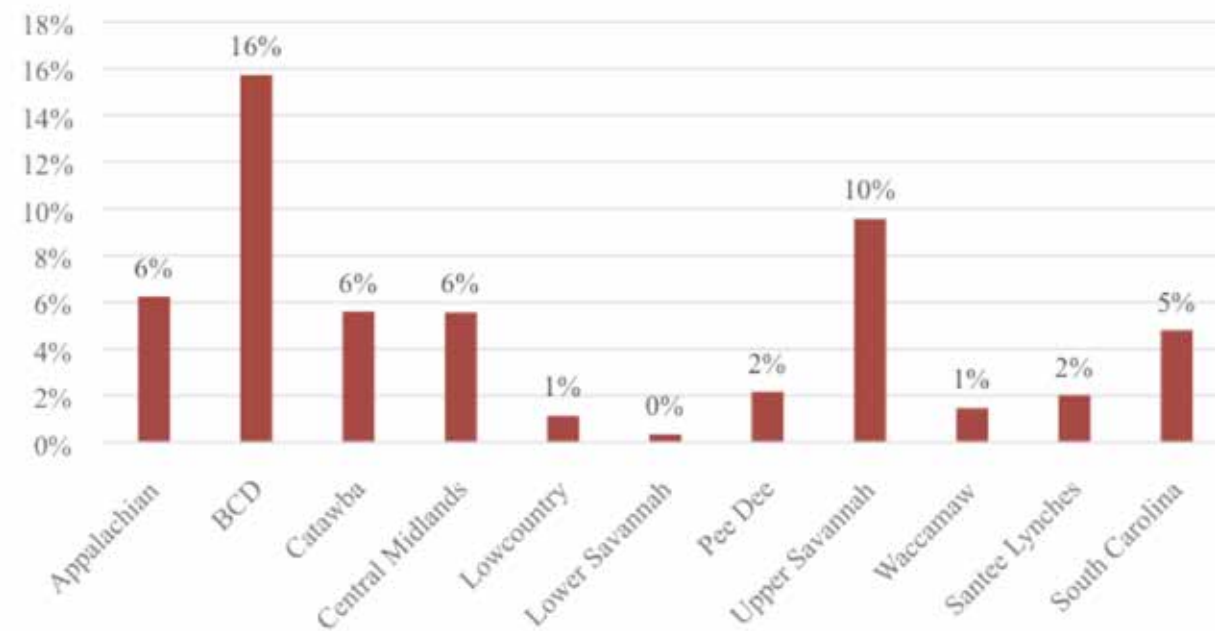
The percentage of public parkland in the BCD region is 16% due in large part to Francis Marion National Forest. This is the highest rate in the state and well above the 5% statewide rate.

## Percentage of Total Area that is Protected Land
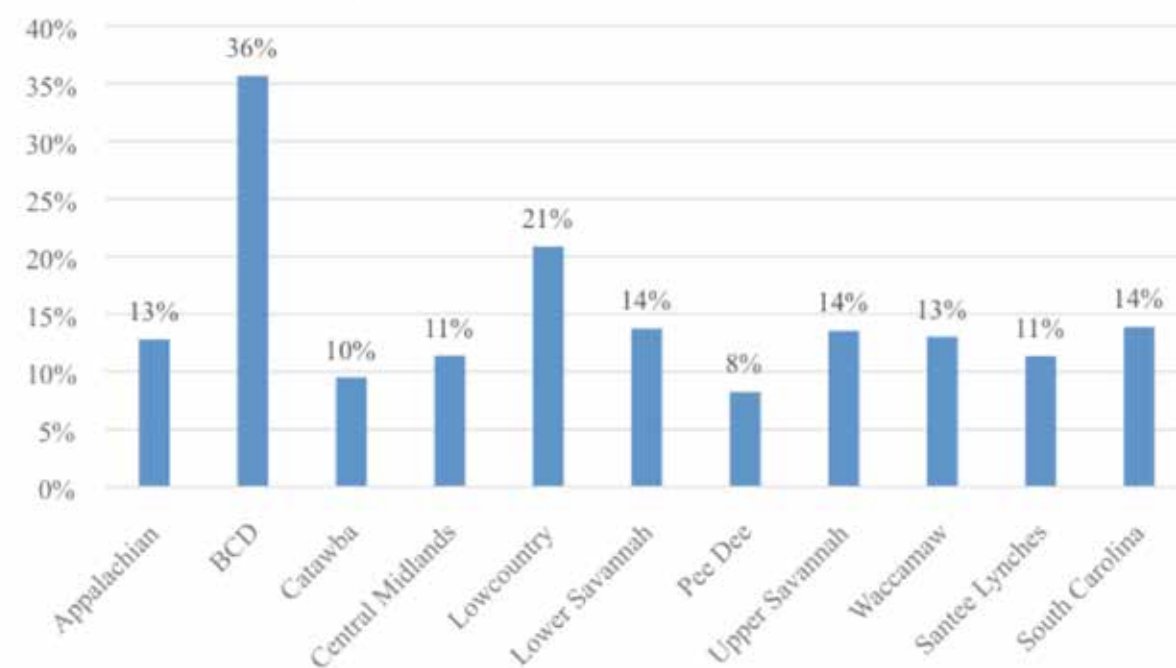
The percentage of protected land in the BCD region is the highest in the state at 36% and is well over the 14% statewide rate.

BCD Priority Areas

BCD stakeholders identified several areas in the region that are priorities for protection and restoration.

- The Edisto River Corridor and ACE Basin are priorities for protection and restoration in the region.

- The Caw Caw Area is a priority for expanding protections as part of the Charleston County Greenbelt Program.

- Johns, Wadmalaw, and Kiawah Islands are priorities for protection.

- Four Holes Swamp is a priority for protection and connection to the ACE Basin and Edisto River Corridor, to the Santee River and Francis Marion National Forest, to Brosnan Forest, and to Congaree National Park. The proposed wildlife crossings on I-26 at Four Holes Swamp and the Ashley River are part of this connected network, as are the Ashley River Corridor, the Lake Connector Area, and the Santee River Corridor Connection.

- The Lower Santee River is a priority for protection and connection between Francis Marion National Forest and Santee Reserve.

- Protecting land adjacent to Francis Marion National Forest is a priority for the region.

BCD COG Priority Areas Map
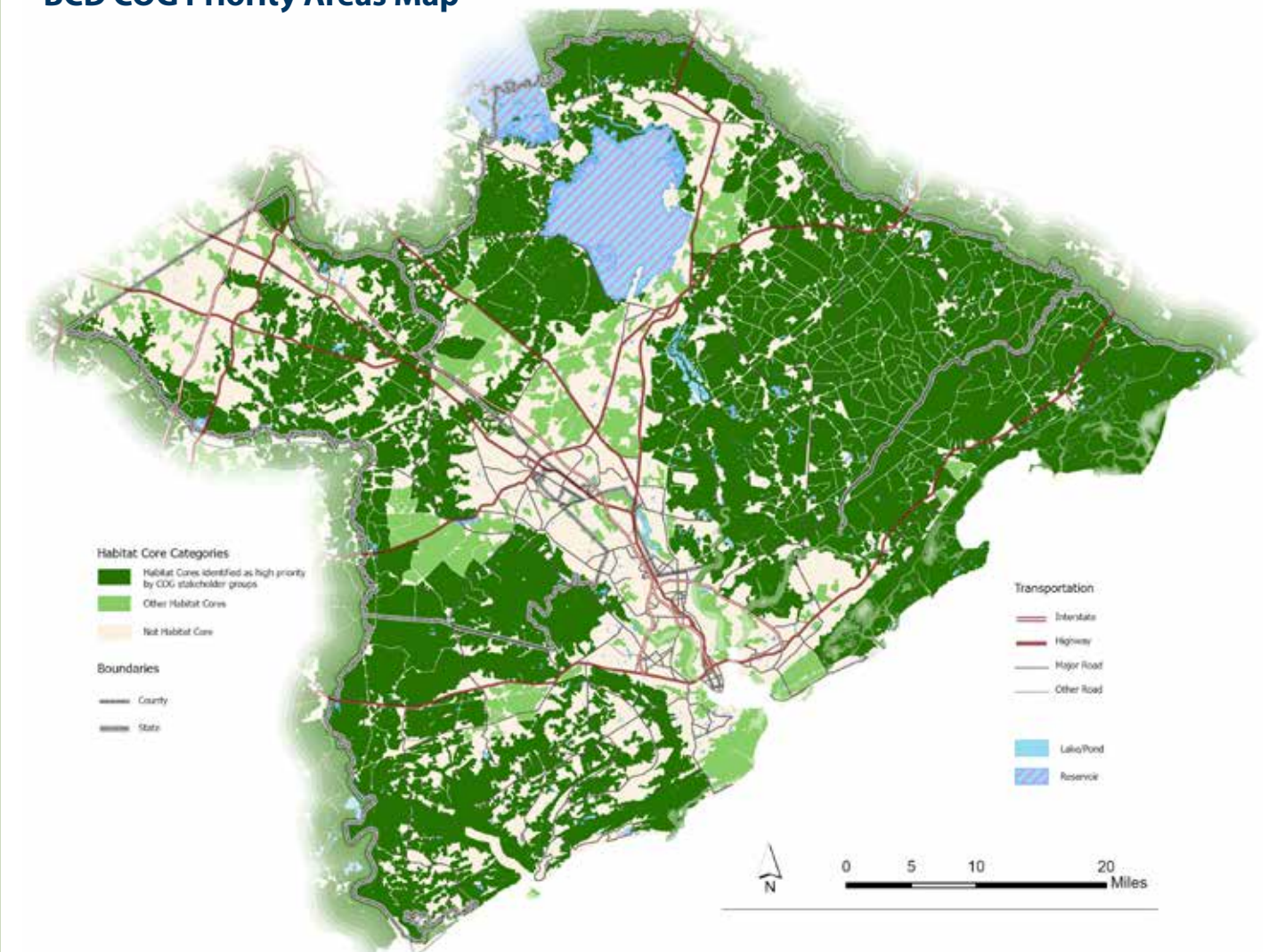
This map illustrates the habitat cores corresponding to the COG identified priority areas for protection and restoration.

BCD Strategies

Project maps to inform these strategies can be found at the end of this chapter as well as on the project HUB site https://scgiplan-gicinc.hub.arcgis.com/. GIS users can access all the GIS data online and download data for any county. Viewing the data does not require GIS skills.

Strategy 1: Continue to utilize the Charleston County Greenbelt Program to protect high value habitats.

The Charleston County Greenbelt program is funded through a half penny sales tax to fund roads, transit, and greenbelts. As of 2021, this popular and successful program had protected over 23,000 acres with 10,000 of that acreage slated to become public parkland. The program's goal is protecting 40,000 acres by 2029. As the Greenbelt program continues to protect land, it should consult the habitat cores and risk data for more targeted land protection based on habitat quality, connectivity, and resilience.

Strategy 2: Expand the use of a Green Space Sales Tax.

Charleston County uses sales tax to raise revenue for protecting land through the Greenbelt program. Dorchester and Berkeley counties should consider putting the Green Space Sales Tax on their ballots to raise funds to conserve more land in the region. Counties can use the funds collaboratively to protect land across county boundaries.

Strategy 3: Create and strengthen solar ordinances.

Large scale solar development is likely to increase in the region and counties must plan for this growth. Berkeley and Dorchester Counties should create solar ordinances. Strengthen solar ordinances in Charleston County. Also, municipalities should consider standards and guidance for rooftop solar as trees and rooftop solar often conflict. The South Carolina Energy Office has resources for creating or updating solar ordinances and examples of model solar ordinances.

Strategy 4: Charleston County will utilize the habitat core's data to inform future land uses.

Charleston County will overlay habitat cores data to analyze and assess their Future Land Use map in the context of existing cores, corridors, assets and risks.

Strategy 5: Connect Francis Marion National Forest, the ACE Basin, and Congaree National Park.

The Charleston Wildway Plan by Biohabitats connects Francis Marion National Forest to the ACE Basin and Congaree National Park to the ACE Basin with wildlife corridors for habitat connectivity and recreation. A critical component of this plan involves safe wildlife crossings across I-26 at MM 186 at Four Hole Swamp and at MM 192 at the Ashley River. With SCDOT's planned road widening of I-26, wildlife crossings or enhancements should be implemented on any bridge replacements.

Strategy 6: Expand collaborative regional planning.

Cities, towns, and counties should collaboratively define growth boundaries and infrastructure investment locations. The habitat cores and corridors data should be used to guide these land planning decisions.

Strategy 7: Create solar development incentives that protect green infrastructure.

Counties and municipalities should create incentive programs to attract solar development projects away from farmland to large warehouses or other big buildings, parking lots, landfills, or industrial sites. Faster permitting for urban solar sites is one example of an incentive, or reduced property taxes could be offered for re-use of an impaired site such as a brownfield.

Strategy 8: The Town of Summerville will continue to meet goals of 2017 Green Infrastructure Plan.

Summerville created a Green Infrastructure Plan in 2017. Since then, the town changed their ordinances to protect green infrastructure, hired a town arborist, developed a master plan for parks and trails, and bought additional land for recreation. Additionally, the town is designing a 20-mile greenway network and developing an urban forest master plan.

Strategy 9: Change ordinances to encourage protection of green infrastructure.

Counties and municipalities should review and change ordinances that undermine the protection of green infrastructure. Examples mentioned include changing excessive parking lot standards and creating more stringent open space requirements that require developers to permanently protect open space.

Strategy 10: Mount Pleasant is planning for green infrastructure.

Mount Pleasant has a tree bank for residential and commercial properties requiring developers to replant trees for those removed or pay a fee in lieu of tree conservation (which can be used to plant trees elsewhere). The city also recently started a low impact development (LID) program for commercial projects. Mount Pleasant is also developing an urban forest master plan with a grant from the SCFC. They also participated in GIC's CanopyCoach[sm] program in 2021 to learn how to map tree canopy.

Strategy 11: The Town of Awendaw will use tree canopy assessment data to plan for green infrastructure and inform its upcoming comprehensive plan.

The Town of Awendaw received a technical support grant from the SCFC for an urban tree canopy assessment and planning assistance. The town will use these data to prioritize new tree plantings, improve existing zoning codes and ordinances, inform its upcoming comprehensive plan, and create an Urban Forest Master Plan.

Strategy 12: The City of Goose Creek is using tree canopy assessment data to plan for green infrastructure.

The City of Goose Creek received a technical support grant from the SCFC to receive an urban tree canopy assessment and planning assistance. The city will use these data to prioritize new tree plantings and improve existing zoning codes and ordinances.

Strategy 13: The City of Folly Beach is using tree canopy assessment data to plan for green infrastructure.

The City of Folly Beach received a technical support grant from the SCFC for an urban tree canopy assessment and planning assistance. The city will use these data to prioritize new tree plantings and prepare the urban forest for storms and natural disasters.

Strategy 14: Plan for sand mining.

Sand mining is a growing industry in Dorchester and Charleston Counties. Regulations on sand mines that consider habitat cores and corridors should be considered and standards for remediation put in place.

Next Steps

The data created for this plan is a foundation upon which to build a fine-grained Green Infrastructure Plan. Any municipality or county wishing to pursue a more comprehensive local plan should contact GIC.

The purpose of this project is to identify and prioritize those green infrastructure assets that most urgently require protection or restoration in the state of South Carolina. The strategies and maps of habitat cores, corridors, assets, risks, and priorities provide a roadmap and shared vision for conservation and restoration efforts of state agencies, counties, cities, and landowners. Moving forward, agencies, planners, and citizens can view and download these priorities, maps, and data through the HUB site GIC has created in partnership with Esri. Additionally, the GIS datasets have been disseminated to all the agencies, municipalities, and organizations involved in this project, so they can use the data to guide their decision making. https://scgiplan-gicinc.hub.arcgis.com/

Maps

BCD Strategic Planning Map: Ranked Habitat Cores and Corridors
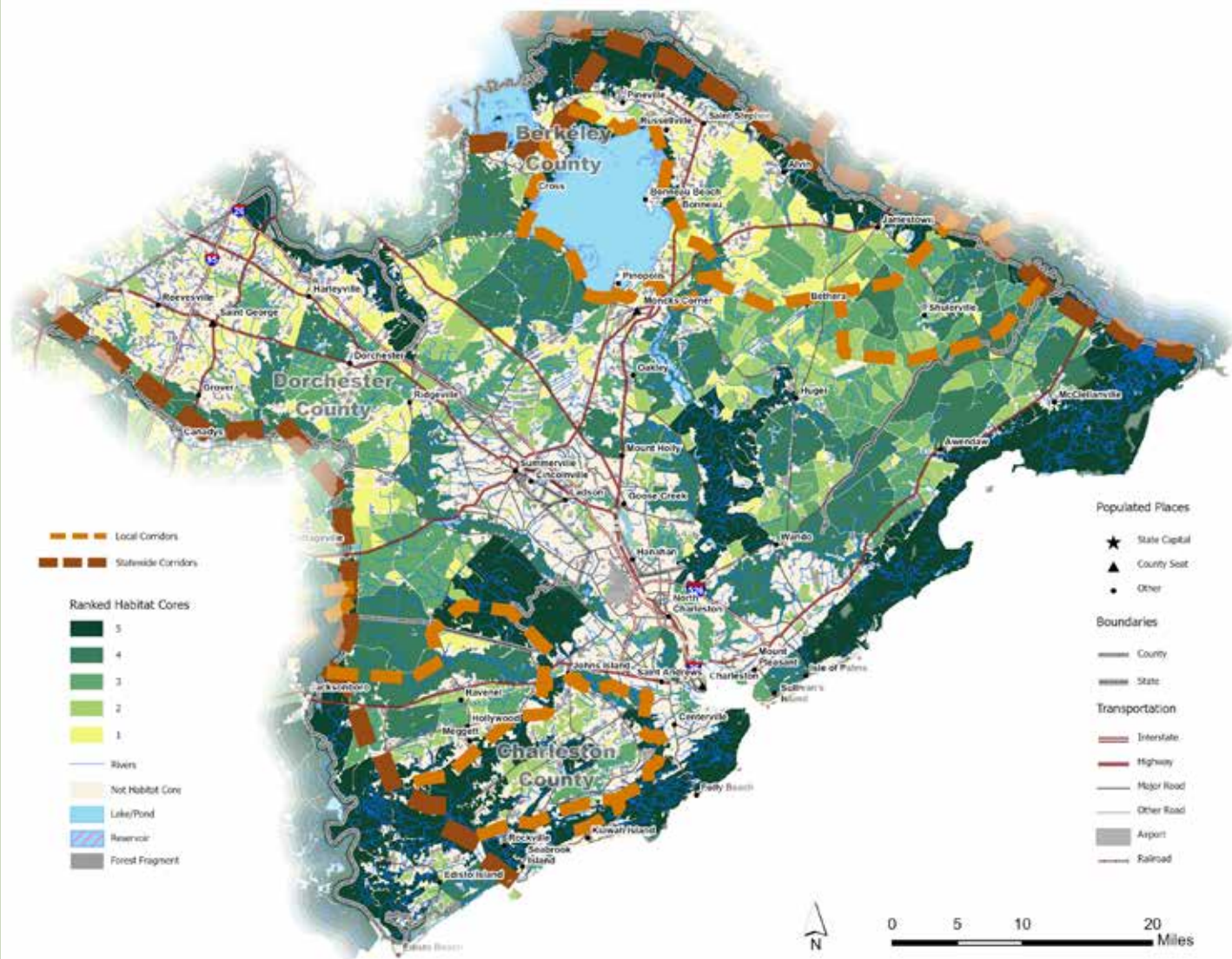
Habitat cores are intact natural landscapes large enough to support interior forest or marsh dwelling species. This map depicts the region's habitat cores and shows them connected by corridors to form a network. The more connected the landscape, the more resilient it is and the more pathways there are for people, pollinators, and plants. The habitat cores are ranked based on ecological metrics, with dark green representing the highest quality habitat cores and yellow representing the lowest quality habitat cores. A ranking of 5 is the best and 1 is the lowest. Additionally, statewide and regional wildlife corridors are represented on this map by brown dashed lines.

BCD Assets: Agriculture Map
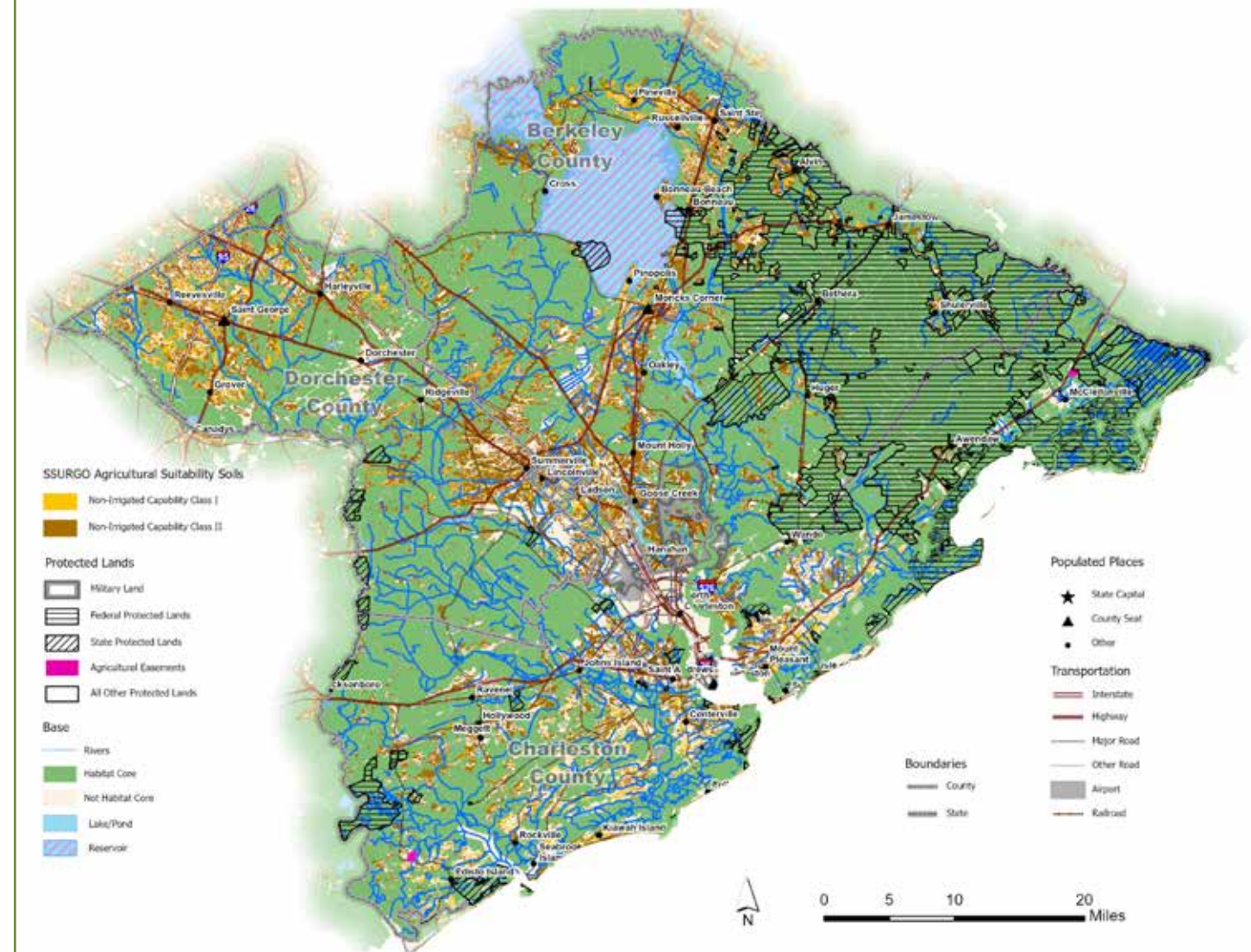
This map identifies the highest quality agriculture soils (classes 1 and 2) on open land, as well as agricultural easements in the region.

BCD Assets: Water Map
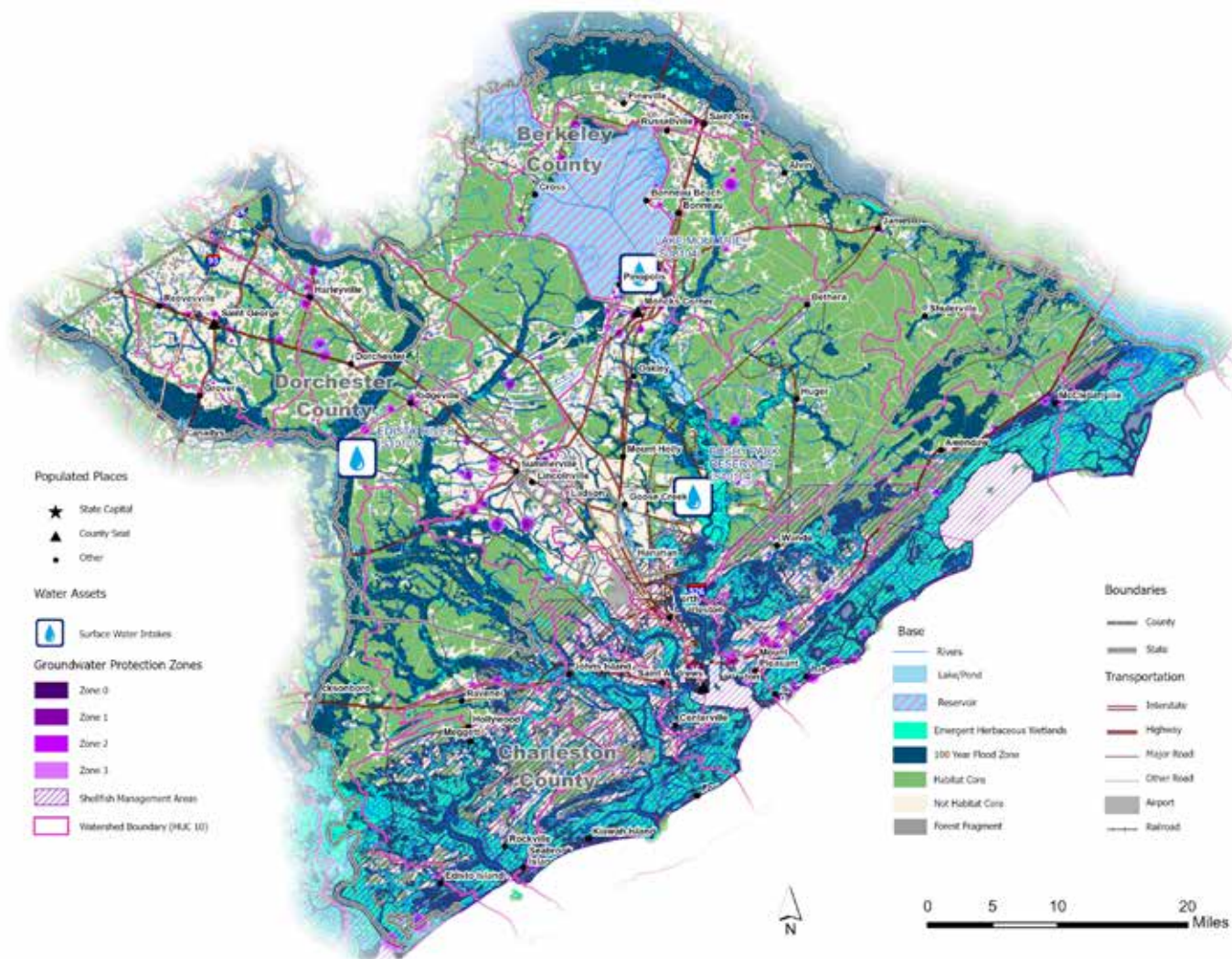
This map depicts drinking water reservoirs, surface water intakes, groundwater protection zones, and the 100-year floodplain in the BCD region. The many forests and wetlands in the region help cleanse runoff to protect surface water quality and provide groundwater recharge.

BCD Assets: Recreation Map
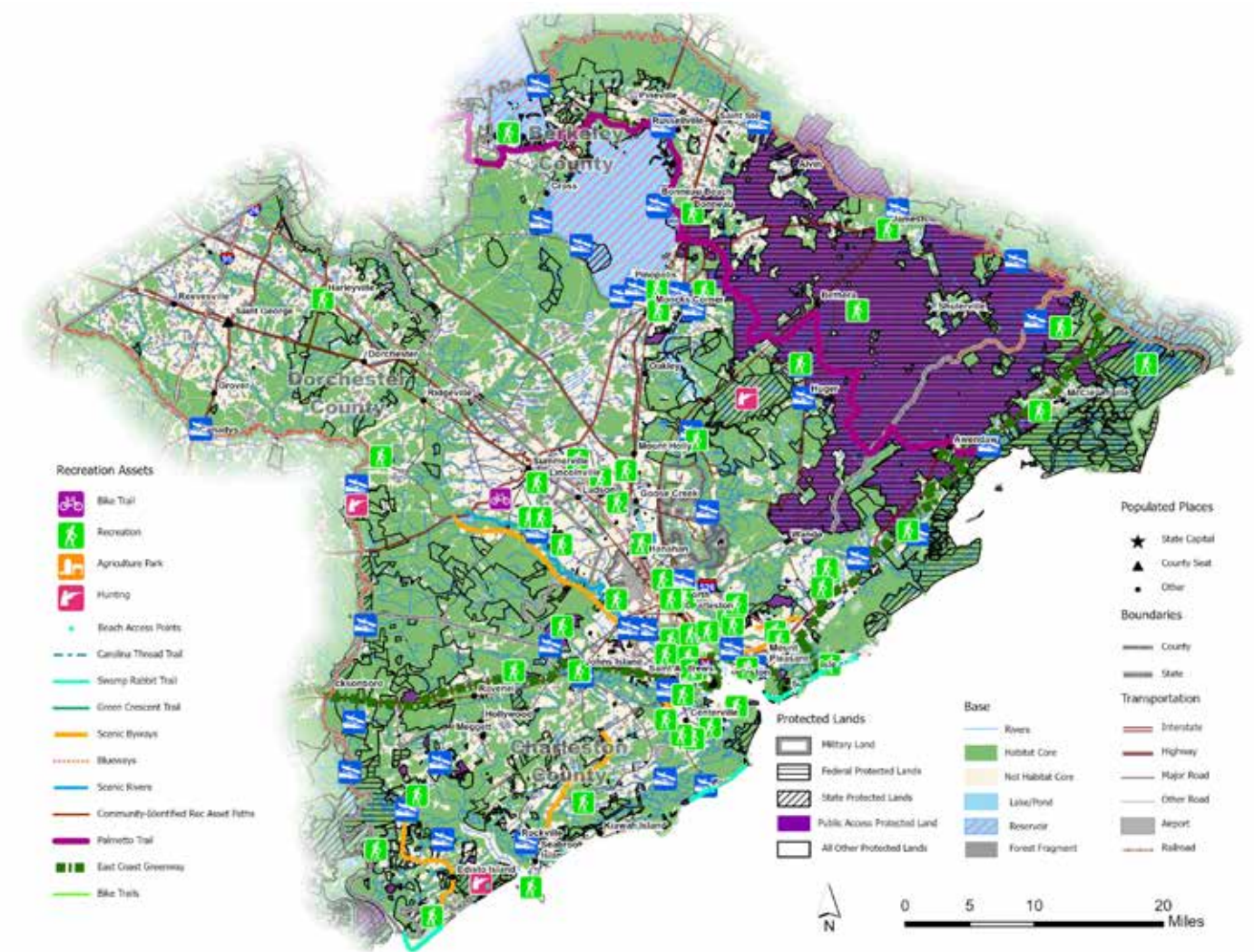
This map depicts boat ramps, blueways, scenic rivers, scenic highways, greenways, Wildlife Management Areas, and federal, state, and local parks over 10 acres in the BCD region. Many recreational activities depend on a healthy landscape for their enjoyment, such as hiking, birding, boating, fishing, hunting, and other nature-based sports. A healthy landscape provides both access and scenic settings for enjoying the outdoors. Large intact habitats provide refuge, shelter, and food for the many species that residents and tourists appreciate when enjoying the outdoors.

BCD Assets: Culture Map
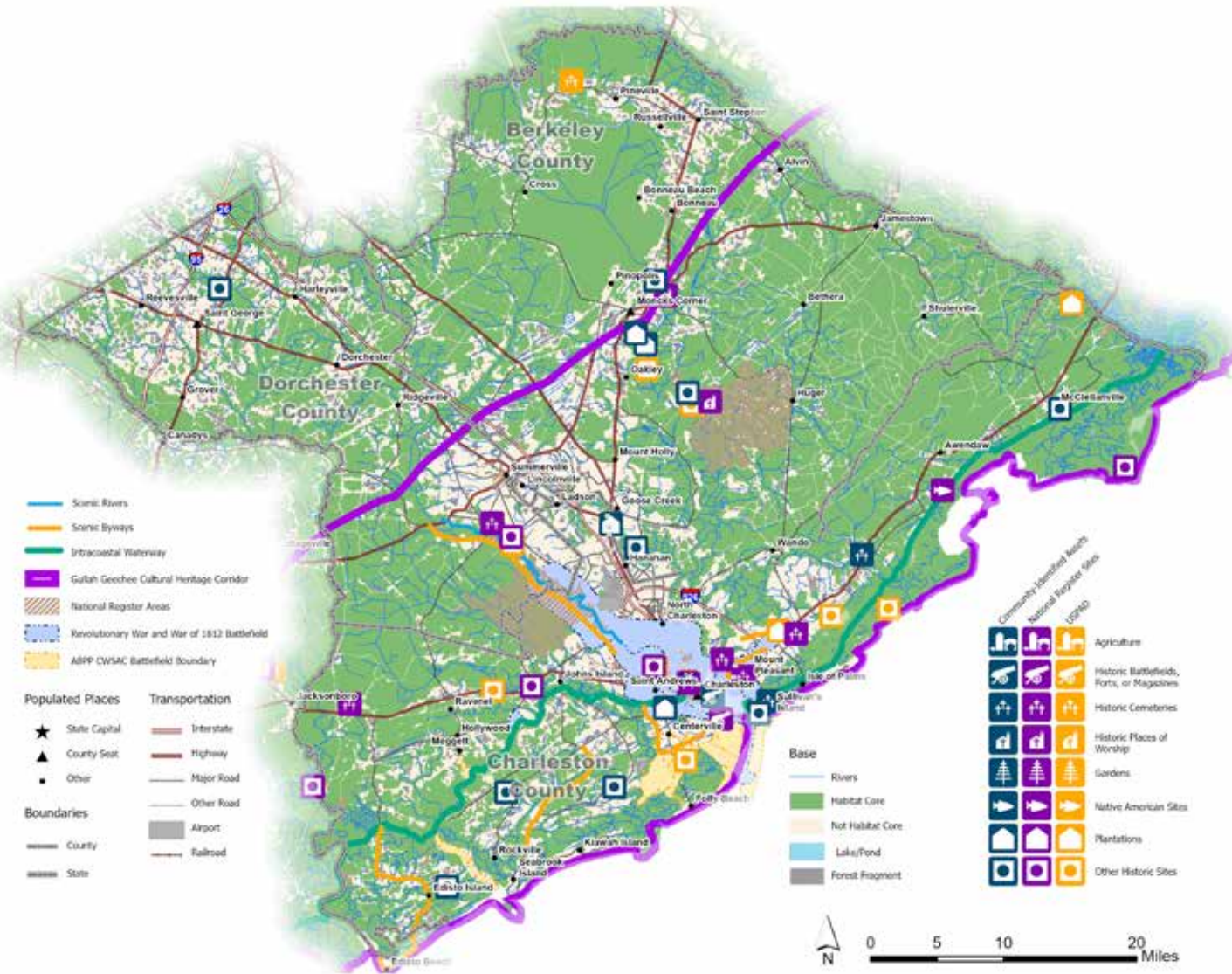
This map displays historic sites, Native Peoples' sites, cultural overlay districts, scenic highways, scenic rivers, and waterfalls in the BCD region. Natural landscapes provide the context, backdrops, and buffers for these sites and contribute to their settings and beauty.

BCD Risks: Development Risk Map
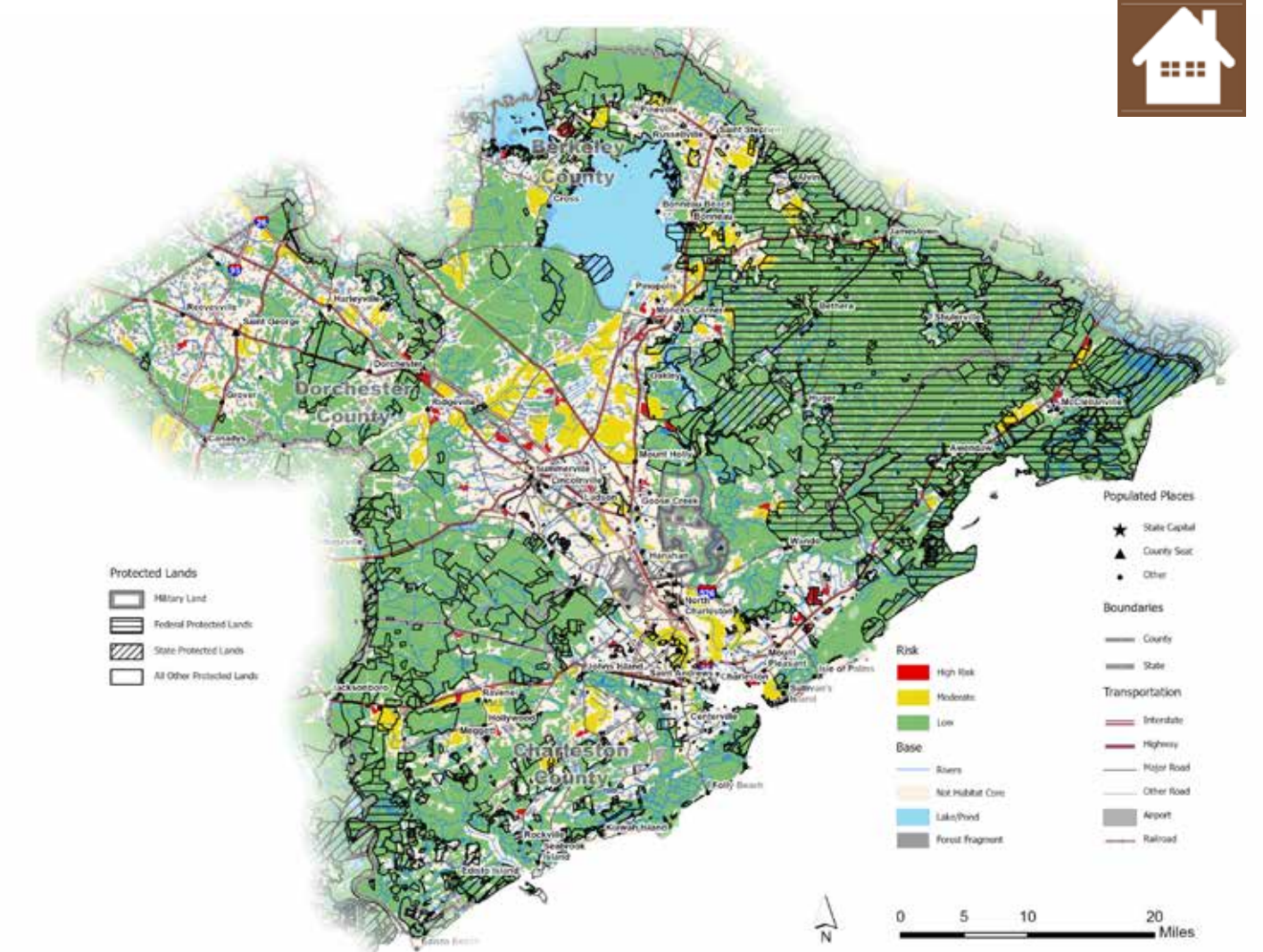
This map depicts the level of development risk based on the SLEUTH Urban Growth Model projected to the year 2060, with protected lands excluded.
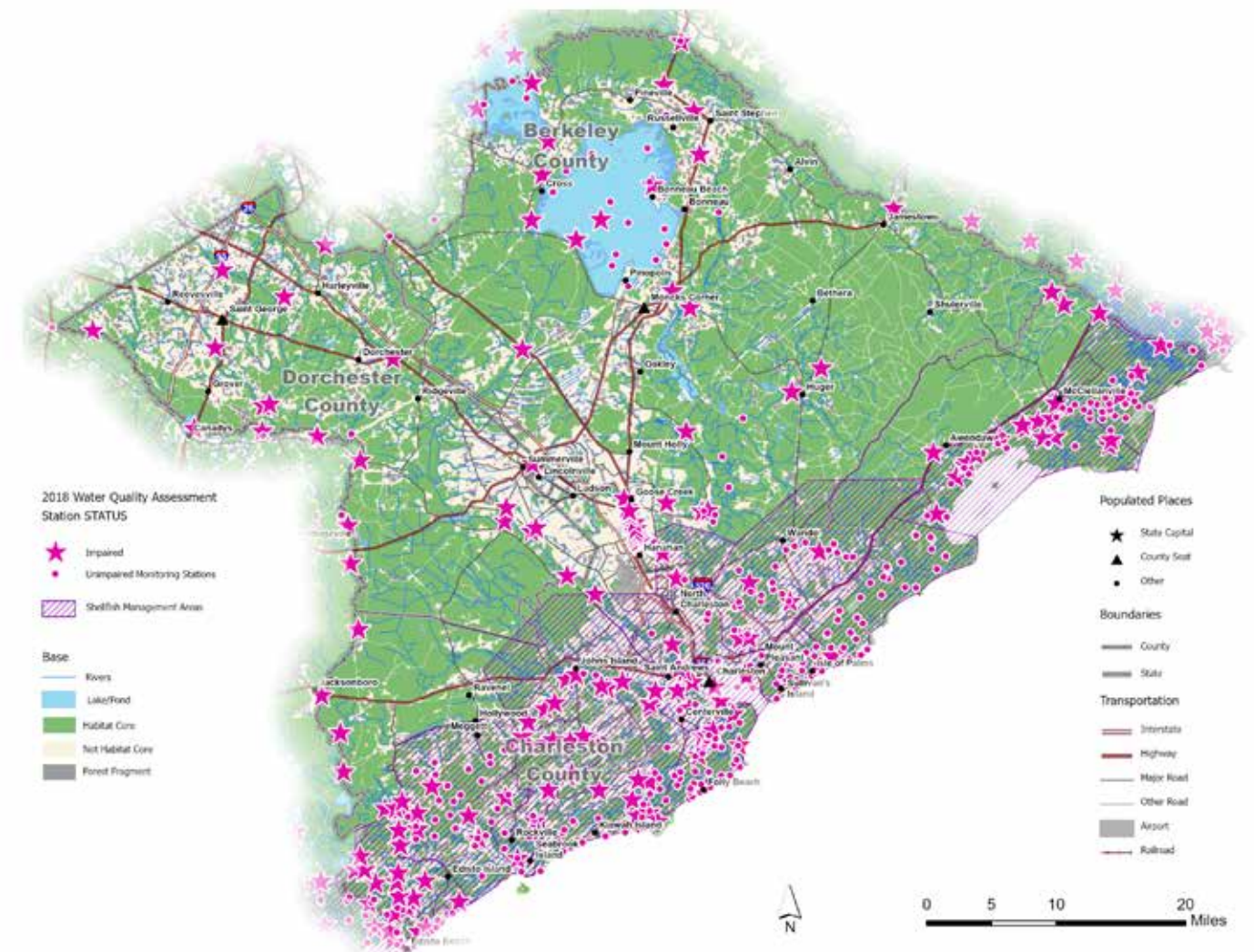
BCD Risks: Solar Development Risk Map
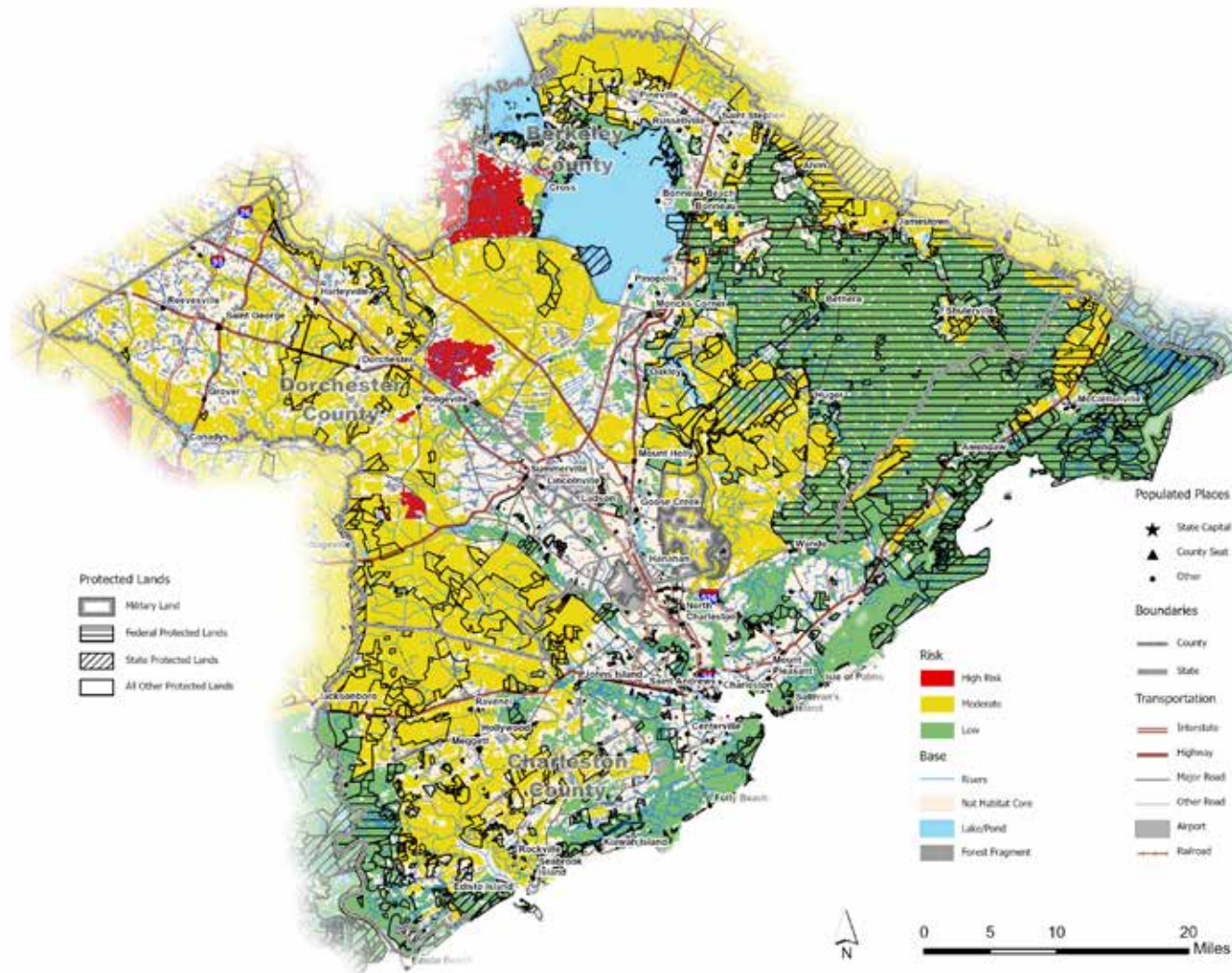
This map depicts the level of solar development risk based on Argonne Lab's Solar Site Suitability Analysis, with wetlands and protected lands excluded.

BCD Risks: Water Quality Impairments Map

This map depicts water quality assessment sites and specific impairments across the region, and includes SC DHEC Water Quality Assessment data.

BCD Risks: Sea Level Rise Map
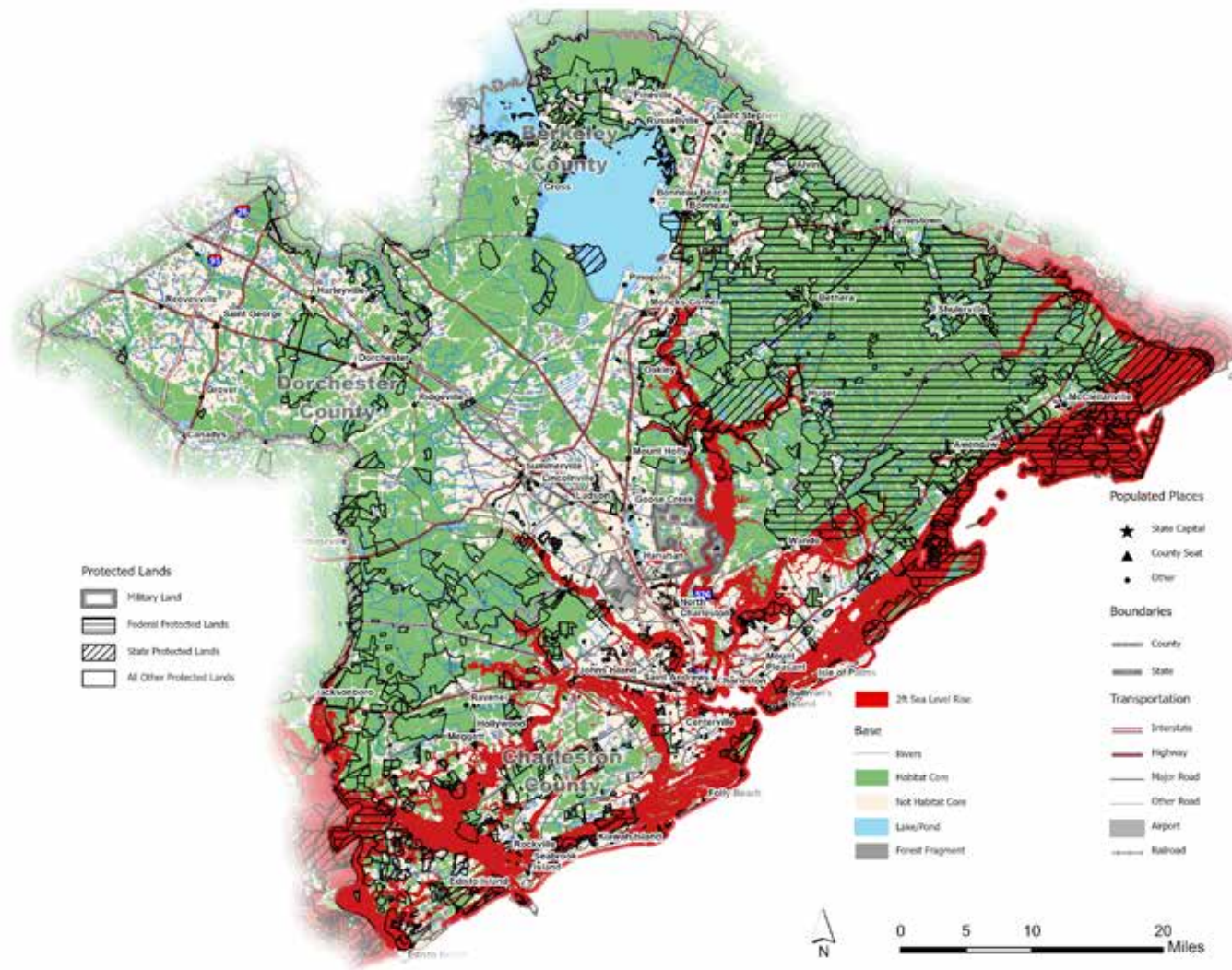
This map shows in red the core areas that will be inundated by 2 ft sea level rise based on the intermediate-high curve for the year 2060 in NOAA's 2017 sea level rise data.

BCD Risks: Storm Surge
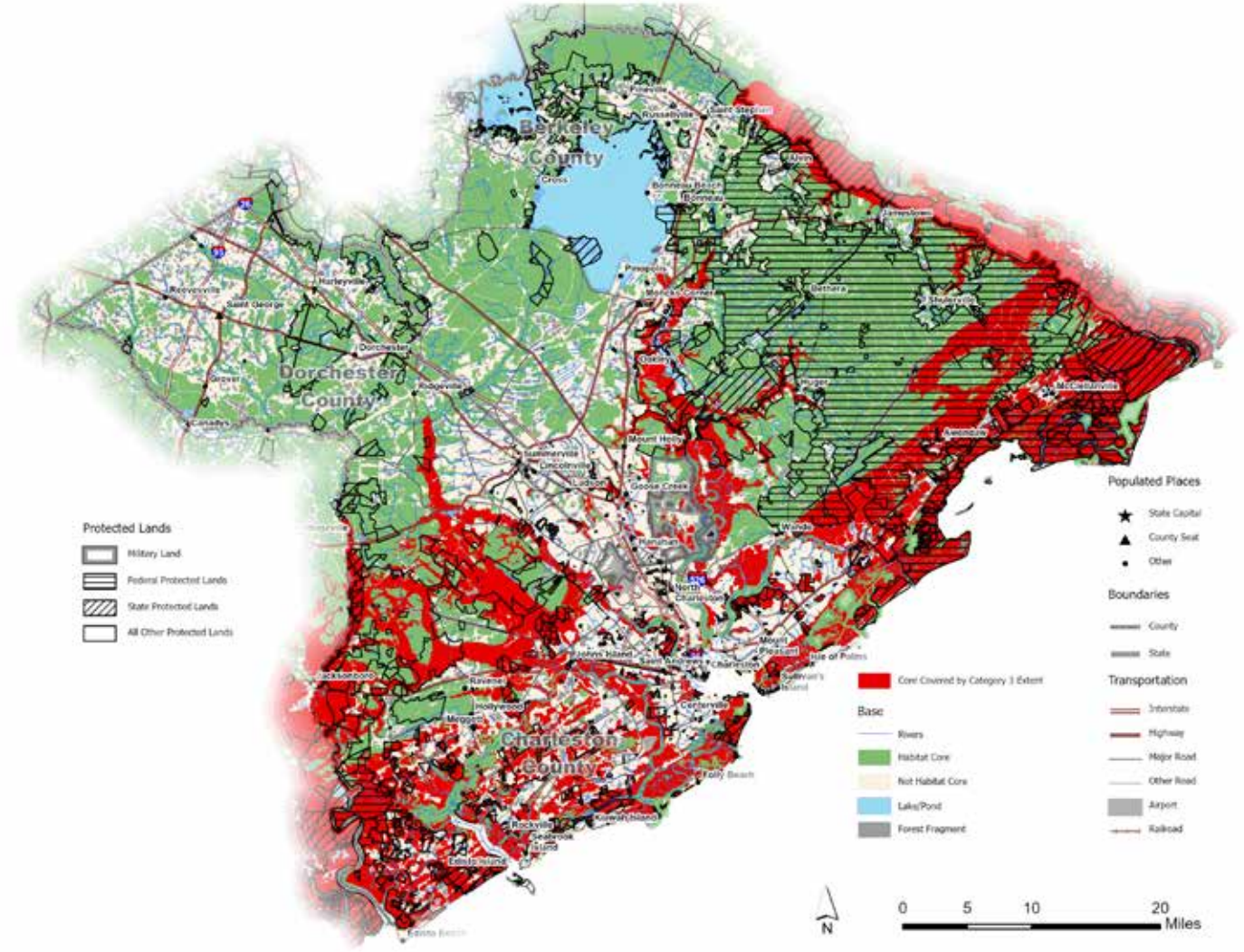
This map shows in red the core areas that will be inundated by a Category 3 storm based on NOAA's SLOSH model for storm surge.

Notes

*Native people of the BCD region as shown on Native Land Map:
Disclaimer from https://native-land.ca/
This map does not represent or intend to represent official or legal boundaries of any Indigenous nations. To learn about definitive boundaries, contact the nations in question.

**Additional Native people of the Lowcountry:
https://www.ccpl.org/charleston-time-machine/first-people-south-carolina-lowcountry
Waddell, Gene. 1980. Indians of the South Carolina Lowcountry, 1562-1751. Columbia, SC: Southern Studies Program, University of South Carolina.